** NEXT MEETING **

SATURDAY, November 19th — 2PM

ARMBRUSTER SCHOOL — GREENDALE

The ATARI 1450XLD Home Computer offers all the features of the ATARI 1400XL— including a built-in direct-connect modem and a voice synthesizer—plus a built-in double-sided, dual-density disk drive, for all-in-one computer operation and program storage. The disk drive provides fast, efficient file storage and retrieval, in the body of a state-of-the-art computer.

o   **MEMORY:** 64K RAM
        24K ROM (operating system plus ATARI BASIC programming language)
o   **KEYBOARD:** Full-stroke design. 66 keys, including HELP key, 4 special function keys and 4 programmable keys
        with 12 pre-programmed functions. International character set. 29 graphics keys.
o   **CPU:** 6502C microprocessor. Clock speed of 1.79 MHz.
o   **SPECIAL ATARI INTEGRATED CIRCUITS:** GTIA (graphic display). POKEY (sound generator and controller ports).
        ANTIC (controls screen and input/output).
o   **PROGRAMMING FEATURES:** Built-in ATARI BASIC programming language. HELP key (provides additional information
        and menu screens). Software compatibilty (works with programs designed for all ATARI Home Computers).
o   **DISPLAY:** 11 graphics modes. 256 colors (128 colors displayable at one time). Maximum 320 x 192 resolution in
        graphics modes. 5 text modes. Maximum text display is 40 columns x 24 lines.
o   **SOUND:** 4 independent sound voices. 3 1/2 octive range.
o   **INPUT/OUTPUT:** Software cartridge slot. Expansion connection (external processor bus for memory expansion and
        adding future peripherals). TV output. Monitor output. 2 controller ports. Serial I/O connector.
o   **DISK DRIVE:** Built-in double-sided, dual-density slim line. 256K-byte storage capacity (per diskette)
        o   **SPEECH SYNTHESIZER:** Translates text to speech with unlimited vocabulary. Can be programmed
        directly to use phonemes.
o   **TELECOMMUNICATIONS:** Built-in direct-connect modem. 300 baud transmission rate.
        (features and specifications subject to change)

PRESIDENT'S RAM
by Gary Nolan

ANOTHER ONE BITES THE DUST...BOOM

(And another one's gone, another one's gone!)

Just heard the news today that TI is getting out of the "Home Computer" business. Add to that the fact that Mattel is pulling back thier ho-hum rubber keyed Aquarius to the test market stage, Osborne going under, Victor having money troubles, Coleco finding it hard to bring the Adam to market for the heavily advertised price of $600, and what do you have? TROUBLE! Right here in River City. YES SIR! Word has it that Warner Comunication is blaming thier big losses on the computer division. Now this is partialy true, if you consider that the games and computers are part of the same department. But with the paranoid nature of Warner Com. being what it is, you just might see Atari make a similar announcement. Or Warner might sell Atari. At least that's the latest rumor. What is not rumor is that the 1400/1450 computers have been put on hold, supposedly until after the first of the year. One computer that was canceled was the 1600, a unit that they denied having in the works. This computer was to be built along with Toshiba and be IBM PC compatible with dual processors. AtariTel is probably gone bye-bye too. When you fire the top three managers of a project it's a good indication that it's dead.

And who's responsible for these changes? No, not John Cavalier, he's working for Apple now. It's James J. Morgan, Atari's new chief exec. Ever since he took control in September heads and projects have rolled. Time will tell if he is right or not. But I do know one thing, and I've been saying it for more than a year now. If they continue to insist on building dedicated video games, they'll continue to lose money at that same rate. Video GAMES are dead! Face it! Nothing is sadder than watching an athlete whose talents have succumbed to time, or the singer whose voice has faded try to hang on to the past glories. Yaz knew when to quit, Ali didn't. I wonder if Warner has the guts, ambition and talent to pull themselves out of the hole they're in before IBM starts throwing dirt on them in the form of the Peanut or PC Jr. or whatever they call it. Or maybe they'll blame some unknown quantity and take the easy way out and sell out to Magnavox or whoever is smart enough to take advantage of the situation. Lets hope that someone, somewhere, sometime soon figures out what's happening and turns things around. Or else we'll all be using those unexciting, overpriced, SAFE products from IBM.

DID I MISS SOMETHING?

I'd like to thank Wally Gingerich for his excellent presentation of Financial Wizard at the last workshop. And yes, it did come up a little short of what we had wanted to do. SO! If there is enough interest, we'll add a fifth workshop in December to cover what we didn't in October. This month will be the maintainence, upgrading workshop. In January we'll do a word processing session and maybe a printer workshop after that. But YOU, yes YOU, will have to let us know in advance if there is enough interest. And the rest of you will have to volunteer to do a short presentation.

THANKS AGAIN

While we're thanking people, we should thank the Trak people for bringing a Trak disk drive to the last meeting. While we didn't have any trouble loading anything, we did notice that it does use the same method of formating as the Percoms. Which means you might run into some difficulty with LJK products. It's a good looking unit that has promise, if everything works as advertised. Why have I become so cynical?

If things work out right I'll be able to give a review on the Trak drive at the next meeting.
While on the subject of disk drives word has it that Astra has folded. Seems strange since I just read in the San Diego UG newsletter that Astra had been to one of thier meetings with some working models. Lets hope that it's not true. It loked like a good product at a good price.

SAY IT AIN'T SO, JOE

I stopped out at the grand opening of American's new store. I'm sure many of you did. I mean really, when Lenny comes to town EVERYBODY shows up sooner or later. Prices were not that impressive. They didn't even have a 600XL on the floor. This kind of suprised me because Atari made sure they had the FIRST 1200XL in the state. But the 600's ARE in town at Toys R Us, selling for $150. They also have both the 1050 and 810 drives for $369. For those of you who might want a 400 or 800 yet, the rebate has been extended until 12/31. While I was out there I filled out one of the slips for the sports car that WOKY was giving away. Well Sat. the 29th I was away running some errands and when I came back the neighbors came over to tell me that my name had been announced over the air. All I had to do was call the station within 92 secs. or something like that and the car was mine. Needless to say, I got home two hours after the time limit expired. Guess who's having call forwarding and a mobile phone installed in his car?

CUF NOTES

CUF is planning a User Group Member show for this spring. The plan is to hold a show for ourselves, members of users groups. It's a way for the members of one group to find out what others are doing. And hopefuly get a better understanding of what other computers are capable of.
For those of you who are asking "What's CUF", CUF is the Computer Users Federation of SE Wisconsin. And it's made up of representatives of groups from around the area. You will be getting a newsletter from them sometime in November.

GOOD-BYE, HELLO....AGAIN

Starting this month Bill Lawrence and Carl Mielcarek take over the disk library from Steve Booth. We should all give Steve a big thank you for the great job he did. As I said at the last meeting, most people don't know how much work is really involved in somthing like this. So, THANKS Steve. And welcome to the wars Carl & Bill.

NEXT TIME

We will have disks for sale at the next meeting. And we should have a good stock of disks from the library to choose from. Basic classes, tech sessions, workshops and more and it's all for your benefit. So be there on the 19th........

November Meeting Agdenda

1:00 PM Officers meeting
2:00 PM BASIC Class - 5th session
(The BASIC class also meets the 1st Tuesday of
each month at Armbruster School. Thursday class
begins at 7:00 PM Call Linda Scott 466-2314 for
more information)
2:00 PM WORKSHOP - Hardware maintenance & upgrades
2:00 PM KIDS KORNER opens
2:30 PM TECHNICAL SESSION - A forum to share various
software and hareward concerns with other members
3:30 PM BUSINESS MEETING
4:30 PM DEMOSTRATIONS:

Bruce Chandler - Turbo 810 disk drive

Joe Sanders - Educational Applications

Kid Korner - New Games including Q'Bert (tm)

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DOUBLE SIDED or REVERSIBLE?

Can double sided 5 1/4" diskettes work in the single drives of ATARI computers?

Double sided diskettes are manufactured for use in systems with dual headed disk drives where the diskette is written or read on both sides of the diskette. Since a dual headed drive has two separate heads, information is stored or retrieved on both sides. The disk itself is never turned over or removed from the drive. Double sided diskettes are not reversible.

Reversible diskettes are used for single headed drives where the diskette is turned over in order to store information on the back side. The reversible diskettes are certified for use on both sides. The diskettes can be turned over with the guarantee that the second side will meet the same standard of excellence as the first side.

Though both double sided and reversible diskettes are certified for use on either side, there are some physical charateristics that distinguish the two. The reversible diskette has two write protect notches and two index holes. The double sided diskette has one write protect notch and one index hole.

All diskettes are manufactured double sided, double density, but not all are tested for double sided or certified for double density. In other words, information can usually be store on both sides, but without the manufacturer's guarantee.

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## HIGH QUALITY SOUND FROM YOUR ATARI 800/1200

by Ron Friedel

You can directly connect your ATARI 800/1200 sound output to the input of a stereo; system by constructing a simple cable that plugs in to the monitor jack. The ATARI 400 computer does not have a monitor jack. This connection is recommended for some of the following reasons:

1. Programs having music are much more enjoyable. This is particularly true in terms of clarity and low register reproduction.
2. An amplifier with flexible tone controls can help clarify speech synthesis programs such as S.A.M.
3. When you turn off the computer or open the cartridge hatch, you will no longer hear that irritating hiss we are used to hearing out of our tv speaker.
4. Using earphones, we now can program or play games late into the night without bothering everyone else in the house.
5. Having a stereo receiver next to the computer lets you easily listen to music, news or sports while working on a program.
6. Explosion sounds can be pretty spectacular.

CONSTRUCTING YOUR CABLE AND CONNECTING YOUR SYSTEM

1. Locate the monitor jack on the computer. The figure below shows the view looking directly into the jack.

D.I.N. 5 Jack

```
             3        1
Audio ---->  •        •
 output     5          4
               •  1  •
                  •  <---- Ground
```
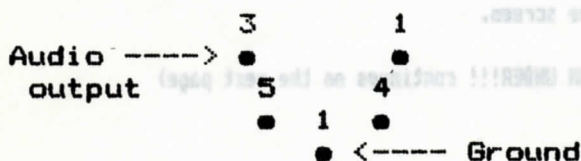
Pin #3 carries the audio signal. Pin #2 is the ground. The other pins carry video information and will not be used in this setup.

2. You will need to buy:
   a. A 5 pin male DIN connector (try Radio Shack).
   b. A length of standard shielded cable with a RCA type phono plug on one end and the other end "stripped" to two wires. (RS 42-237)
3. CABLE ASSEMBLY INSTRUCTIONS
   a. Solder (don't use acid core solder) the middle wire for the shielded cable to pin #3 on the DIN connector. Pin #3 is the top left pin when looking at the DIN plug from the rear.
   b. Wrap plastic insulation tape around this connection.
   c. Solder the outside shield wire to pin #2 of the DIN plug.
   d. Wrap plastic insulation tape around these connections.
   e. Crimp the strain relief (if any) around the wire and reassemble the DIN plug.
   f. Connect the RCA phono plug to an unused high-level input on your amplifier (AUX, SPARE, TAPE or TUNER).

Be careful to set the volume on your amplifier relatively low, as the output from the computer is quite high as audio signals go. You might also find it necessary to turn down the treble control somewhat to soften the edges of the square waves produced by the computer.

We exchanges newsletters with many ATARI user groups. Through one of our exchanges, we receive **INSIDE INFO** from the Atari Computer Enthusiasts (N.S.W.) located in Sidney Australia.

This group produces a very fine newsletter just chucked full of articles and programs. It shows that our fellow Atari-ests from down under are definitely not 'under' in the Atari world.

I have selected a few short programming articles from their October issue to share here.

POLYGON PLOTTER
by Jamie Athas

Not so lang ago, I found a program for the Apple which draws shapes according to your inputs. I just <u>had</u> to convert it to ATARI BASIC. The program ended up completely different to the Apple version, apart form the formulas. Here are a few sample inputs for you to try! Circle - 70,7. Square - 4,100. Triangle - 3,100. Hexagon - 6,70. Octagon - 8,65. Pentagon - 5,80.

```
1 REM ###############################
2 REM #        POLYGON PLOTTER      #
3 REM #        by Jamie Athas       #
4 REM # Published by Atari Computer #
6 REM #     Enthusiasts (N.S.W.)    #
7 REM #        October 1983         #
8 REM ###############################
10 PI=3.14159265
20 GRAPHICS 0:POKE 710,0
30 ? :? :POKE 764,255
40 TRAP 40:? "HOW MANY SIDES";:INPUT N
50 TRAP 50:? "SIDE LENGTH";:INPUT L
60 K=2#PI/N:R=0
70 GRAPHICS 8+16:POKE 710,0:COLOR 1
80 X=120:Y=80:PLOT X,Y
90 TRAP 200
100 FOR I=1 TO N
110 X=X+L#SIN(R)
120 Y=Y+L#COS(R)
130 DRAWTO X,Y
140 R=R+K
150 NEXT I
160 FOR WAIT=1 TO 1000:NEXT WAIT
170 GRAPHICS 8+32:POKE 710,0:POKE 752
1:? :? "     PRESS ANY KEY TO CONTINUE":POKE 764,255
190 RUN
200 GRAPHICS 0:POKE 710,0:? ?: "YOUR LENGTH WAS TO LONG
FOR THE    NUMBER OF SIDES REQUESTED!":GOTO 30
```

CREATE INSTANT DIRECTORIES
by Garry Francis

Imagine that you've just typed a program into the computer and you want to save it on a disk with the name MYPROG.BAS, but you're not sure whether you've used that name before. What do you do?

Imagine that you've just finished debugging a program and you want to ENTER a co-resident renumbering utility, but you can't remember which disk it's on. What do you do.

These are just two of the many situations where you need to go to DOS to get a disk directory, but if you do, you'll lose the program in memory. There are several solutions to this problem, but none of them are really adequate. I've given the problem some thought and came up with the following solution. It requires no extra memory, it can be used with any program in memory, it does not append unwanted lines to the program in memory, it does not require you to go to DOS, it does not need MEM.SAV and it uses up only one sector on your valuable disk space. Sound to good to be true? Read on.

Type in the program given below making sure you enter A$ exactly as shown. The program is called CREATE because, when run, it will create a file called DIR. I chose this name as it is short for directory and hence easy to remember. You can call it something else is you like.

So how does it work? DIR is a one line BASIC program without any line number. It is saved to disk in LIST (i.e. untokenised) format. When you type ENTER "D:DIR it will be entered into memory and executed immediately - just as though you had typed it in direct mode.

So all you need to do is use CREATE to put a copy of DIR on each of your working disks. Alternatively, you can use CREATE the first time and use Option J (Duplicate File) from DOS for subsequent copies. Whenever you want a disk directory, just insert the disk (it must have DIR on it), type E. "D:DIR and a directory will be printed on the screen. If there's a lot of entries in the directory, use CTRL-1 to prevent them from scrolling off the screen.

Note that the directory will be terminated by ERROR 136 which simply indicates that the end of the directory has been reached. IOCB #1 will be left open after the directory is printed, so you may need to close it by typing 'END' or 'CLOSE #1' - a small price to pay when you consider the other advantages.

```
1 REM ############################
2 REM #        CREATE           #
3 REM #     by Garry Francis     #
4 REM # Published by Atari Computer #
5 REM #   Enthusiasts (N.S.W.)   #
6 REM #        October 1983      #
7 REM ############################
10 DIM A$(86):A$="POKE82,2:POKE83,39:GR.0:CLR:DIMF$(17)
:CL.#1:O.#1,6,0,'D:#.#':F.I=1TO64:I.#1,F$:?F$:N.I"
20 A$(54,54)=CHR$(34):A$(60,60)=CHR$(34):OPEN #1,8,0,"D
:DIR":? #1;A$:CLOSE #
1:END
```

‡‡‡

MULTICOLOUR GTIA DEMO
by Peter Douglas

Here is a simple little program which may excite some of our members. A friend of mine wrote it, so I can't claim any credit for it, but I thought it was good enough to share around.

The D=2 in line 10 has the effect of drawing every second horizontal line each time through and it gives an optical effect of 255 colours (i.e. 15 colours overlayed on 15 colours - not counting the black background). [This principle was discussed in some detail by Alan J. Zett in SoftSide #39 page 71 ...GF]

If you change line 70 to read ...THEN F=F+1, it will quickly cycle through the colours whenever the fire button is pressed. As it is, the fire button changes the colour to black and "paints" over the colours to start again or create patterns.

By the way, I previously didn't know (and therefore others probably don't know) that CTRL-1 can be used to stop and start this sort of graphics display. Anyway, I hope you like it.

===

```
1 REM ############################
2 REM #   MULTICOLOUR GTIA DEMO   #
3 REM #   by Peter Douglas' friend #
4 REM # Published by Atari Computer #
5 REM #   Enthusiasts (N.S.W.)    #
6 REM #        October 1983        #
7 REM ############################
10 F=4:C=1:D=2:X=4:Y=6:A=75:B=117
20 GRAPHICS 11
30 COLOR F
40 S1=RND(0)
50 S=INT(3*S1)
60 IF S=1 THEN F=F+1:POKE 77,0
70 IF STRIG(0)=0 THEN F=0
80 IF F>15 THEN F=0
90 PLOT X,Y:DRAWTO A,Y
100 DRAWTO A,B:DRAWTO X,B
110 DRAWTO X,Y
120 IF X>75 THEN C=-C
130 IF X<3 THEN C=-C
140 IF Y>177 THEN D=-D
150 IF Y<6 THEN D=-D
160 X=X+C:Y=Y+D:A=A-C:B=B-D
170 GOTO 30
```

‡‡‡

(Note: Your Milatari publications library contains copies of newsletters from many clubs. Take time at the next meeting to look through these fine publications. As with the book and magazines in the library, you may check any of the newsletters on file.)

===

SEEK and FIND

I came across a program which can build word puzzles and thought we might try a few. The program allows you to construct a letter maze of varying dimensions and with different numbers of words embedded in the maze. The words run horizontally, vertically or diagonally. The letters of a word may run in a forward or reverse direction.

The 8 hidden words are: ATARI NOLAN BUSHNELL CASSETTE BYTE DISK ROM RAM.

```
A Q S Q K W B H C O
R C H J P C A A N I
R O M O B H S E N W
K G L Y Y S J D R Y
Z S T U E Y I Z C S
A E I T U K V N M F
T B T D H O B A L M
A E Q E F X R A L W
R L L E N H S U B Y
I I N O N O L A N W
```

SWITCHING SCREENS

1) Display List Alternation
2) RAM Shadows of Hardware Registers
3) Using the Vertical Blank
Items 4 and 5 will be in the December issue
4) Display List Modification
5) Using Central I/O

Information provided by:

ATARI INC.
CONSUMER PRODUCT SERVICE
PRODUCT SUPPORT GROUP

DEMOPAC #6

SWITCHING SCREENS
Display List Alternation
JB 2/82

It is often necessary or desirable to keep two separate screens of data in memory, and swith back and forth between them. You may wish, for example, to display one screen while updating the other, or you may simply wish to use the switching for an animation effect. The technique is sometimes called page-flipping or paging.

In order to switch screens on the Atari, you must create two separate display lists, each with its own data area. The switch is accomplished by simply changing the pointer to the display list. This two-byte pointer is located at decimal 560 and 561.

BASIC sets up a display list, complete with data area, every time you enter a new graphics mode. The location is based on the top of memory pointer, RAMTOP, located at decimal 106. In the example following, an alternate display list is created by moving RAMTOP down 32 pages in memory, and then calling a new graphics mode. Since RAMTOP is a high-byte pointer (that is, it is always on a page boundry), the low byte of the new display list remains the same, while the high byte moves down 32 pages. In order to switch between the two, it is only necessary to change the high byte, at location 561.

If you wish to update one screen while displaying the other, you must keep track of the location of the screen data areas. The display list has its own pointer, called the LMS address, which is kept at the 5th and 6th bytes. (If the starting address of the display list, DL=PEEK(560)+ PEEK(561)* 256, then the LMS address is at DL+4 and DL+5.) BASIC, however, uses another pointer, called SAVMSC, located at decimal 88 and 89. When you enter a graphics mode and a new display list is set up, SAVMSC is updated from the LMS address. BASIC PLOT and DRAWTO statements use SAVMSC to fine an address at which to store data.

In order to use BASIC to write data to one screen while displaying the other, you must change the high byte of SAVMSC (decimal 89) back to its alternate value. Your PLOT data then goes to the alternate screen, while the display still uses the LMS address to get its date for the screen image. Remember that SAVMSC is only updated when you enter a graphics mode and set up a display list. When you switch between display lists, SAVMSC does not change.

When you are updating your alternate screen, you may get out-of-bounds errors if your two screens have different x/y limits. BASIC uses location 87 decimal to determine the mode forbounddary checking. When you change SAVMSC to your alternate screen, you should also put the alternate screen mode number at 87. For example, if you are showing a mode 3 Screen and updating a mode 7 screen, POKE 87,7 when you wish to write to the mode 7 screen.

```
1 REM *** DISPLAY ALTERNATION ***
2 REM ********** CC/JB 2/82 **********
3 REM ***********************************
10 GRAPHICS 7:REM set up first display list
20 DL1LO=PEEK(560):DL1HI=PEEK(561):REM keep address of first display list
30 COLOR 1:FOR X=150 TO 10 STEP -10
31 PLOT X,79:DRAWTO 159,0
32 NEXT X:REM draw something on screen 1
35 REM ********************************
40 POKE 106,PEEK(106)-32:REM move RAMTOP down 32 pages
50 GRAPHICS 7:REM set up second display list
60 DL2LO=PEEK(560):DL2HI=PEEK(561):REM keep address of second display list
70 COLOR 2:FOR X=10 TO 150 STEP 10
71 PLOT X,0:DRAWTO 159,79
72 NEXT X:REM draw something on screen 2
75 REM ********************************
80 REM now change the high byte pointer to the display list
81 REM with a delay, so each screen can be seen.
90 POKE 561,DL1HI
95 FOR WAIT=1 TO 200:NEXT WAIT
```

```
100 POKE 561,DL2HI
105 FOR WAIT=1 TO 200:NEXT WAIT
110 GOTO 90
```

RAM Shadows of Hardware Registers
JB 6/82

A number of hardware registers are associated with RAM locations, known as shadows. Shadow registers are used to update the actual hardware registers during the vertical blank routine. Each sixtieth of a second, after the screen is updated, the OS VBLANK routine reads the value from each shadow register in RAM and writes the value into the corresponding hardware register.

The shadow registers can be used along with display list interrupts to produce different effects. The color registers, for example, are all shadowed, so a display list interrupt that changes a color can update either the hardware register or its shadow. When the hardware register is changed directly, the new color appears on the screen immediately, wherever the interrupt occurs. After the screen is drawn, the VBLANK routine reads the original value from the shadow register, and restores it to the hardware register. The original color then appears at the top of the screen, and remains there until it encounters the interrupt again.

If you wish to make a permanent change, which affects the entire screen, you would change the shadow register. The change is not apparent until the following VBLANK. No change occurs at the line of the interrupt, but as soon as a new screen is drawn, the shadow value goes into the hardware register, and the new color appears. This change affects the whole screen, and lasts beyond the frame in which the interrupt occured.

The register and its RAM shadow can also be used together. Following is an example of a display list interrupt routine. The BASIC program POKEs in the values of the object code from the machine language service routine listed below it. In the routine, the hardware register is changed to produce an immediate color change on the screen. The original value is still in the shadow, so the routine reads the shadow to restore the original color. The rest of the screen then contains the original color.

Some of the familiar locations such as CH(last key pressed, 764), CHBASE (character set pointer, 756) and even the display list pointer (560,561) are actually the RAM shadows of the hardware registers. The controller locations (paddle and joystick) are also shadowed.

```
1 REM DISPLAY LIST INTERRUPT
2 REM JB 6/82
3 REM use a display list interrypt to change the color of the first line
4 REM of a graphics mode 2 screen.
5 REM *****************************
10 GRAPHICS 2
20 FOR ADDRESS=1536 TO 1536+28:REM set up service routine on page 6
30 READ BYTE:POKE ADDRESS,BYTE:REM get opcode value, put in address
40 NEXT ADDRESS
48 REM these data statements contain the opcode values of the machine
49 REM language service routine.
50 DATA 72,138,72,141,10,212,169
51 DATA 194
52 REM 194 is the color, in this case green.
53 DATA 141,26,208,162,15,141,10,212,202,208,250,173,200
54 DATA 2,141,26,208,104,170,104,64
55 REM *****************************
60 POKE 512,0:POKE 513,6:REM point DLI vector to page 6, where code is.
70 DL=PEEK(560)+PEEK(561)*256:REM start address of display list
80 POKE DL+2,112+128:REM set interrupt flag before first mode line
90 POKE 54286,192:REM enable display list interrupts
100 PRINT #6;" THIS IS COLOR 194"
```

```
              10 ; DISPLAY LIST INTERRUPT SERVICE ROUTINE
                20 ;     This routine saves the registers, waits for
synchronization
              30 ; with the screen, and changes the background color.
              40 ; It waits for 16 scan lines (one mode line), then changes
              50 ; the color back, and restores the registers
              60 ;
D40A          70 WSYNC  = $D40A
D01A          80 COLBAK = $D01A
02C8          90 SHADOW = $2C8
00C2          0100 COLOR = 194
              0110 ;
0000          0120   *=$600
0600 48       0130   PHA
0601 8A       0140   TXA
0602 48       0150   PHA
0603 8D0AD4   0160   STA WSYNC
0606 A9C2     0170   LDA #COLOR
```

```
0608 8D1AD0   0180      STA COLBAK
060B A20F     0190      LDX #$F
060D 8D0AD4   0200 LOOP STA WSYNC
0610 CA       0210      DEX
0611 D0FA     0220      BNE LOOP
0613 ADC802   0230      LDA SHADOW
0616 8D1AD0   0240      STA COLBAK
0619 68       0250      PLA
061A AA       0260      TAX
061B 68       0270      PLA
061C 40       0280      RTI
```

Using the Vertical Blank
by JB 1/82

Machine language code which alters the screen display should be synchronized with the screen in order to avoid unsightly glitches. If a change is made while the screen is bieing drawn, it occurs in plain sight and in unpredictable places. In order to make sure that your changes occur between screens, the code should be places in the vertical blank, which occurs every sixtieth of a second. Following is an example of a simple Vertical Balnk Interrupt (VBI) or VBLANK routine.

There are two places to put a vector to your code, one at the beginning and one at the end of the OS VBLANK routine. If you put your code before the OS routine, it is in the "immediate mode". If you put it after, it is "deferred mode". An immediate VBLANK routine has 840 machine cycles available, and a deferred routine has 1470 cycles available. The last part of a deferred routine might be visible on the screen, so display changes should be made in immediate mode, or at the beginning of deferred mode. The example uses deferred mode.

There is a built-in routine for setting the vector to the VBLANK code, called SETVBV. The address is passed with the low byte in the Y register and high byte in the X register. The accumulator should contain a 7 to select deferred mode, as shown in the example, or a 6 to select immediate mode. After calling SETVBV, continue with the main-line program. Since there is no main-line program in the example, the machine simply hangs in an infinite loop. Exit the program with SYSTEM RESET.

The example routine itself is located at an arbitrary location on page six. It checks the trigger of joystick 0 by masking out all but the least significant bit, and checking for the 0 which indicates that the trigger has been pressed. If it hasn't, we exit to the main-line program, and wait for VBLANK to come around again. If it has, we get the background color for mode 0 from the shadow register, add one to the number, and put it back. We then exit normally. To exit from a deferred VBLANK routine, use the vctor given ($E462). To exit back to the OS BLANK routines from immediate mode, jump to location $E45F (SYSVBV).

There is an execellent discussion of VBLANK processing in De Re ATARI, chapter 8.

```
              10 ;VERTICAL BLANK ROUTINE
              20 ;  changes color of screen on
              30 ;  joystick trigger JB 1/82
              40 ;**********************************
0000          50 *=$600
              55 ; set up vector to VBLANK routine
0600 A050     60    LDY #$50   ;address of routine, lo
0602 A206     70    LDX #$06   ;address, hi byte
0604 A907     80    LDA #$07   ;specify deferred mode
0606 205CE4   90    JSR $E45C  ;call SETVBV
0609 4C0906   0100 LOOP JMP LOOP ;continu with main-line program
              0110 ;
060C          0120 *=$650
              0125 ;VBLANK routine
0650 AD8402   0130    LDA $0284  ;check trigger 0
0653 2901     0140    AND #$01   ;least significant bit
0655 C900     0150    CMP #$0    ;is it pressed?
0657 D007     0160    BNE EXIT   ;no, forget it
0659 AEC602   0170    LDX $2C6   ;yes, get color 2 from shadow register
065C E8       0180    INX        ;change the color
065D 8EC602   0190    STX $2C6   ;put it back
0660 4C62E4   0200 EXIT JMP $E462 ;jump to XITVBV
```

NEWSLETTER INFORMATION:

This newsletter is written and printed by members of the Milwaukee Area ATARI User's Group (MILATARI), an association of individuals with a common interest in using and programming ATARI computers. MILATARI is not affiliated with the ATARI company or any other commercial organizations.

All articles are written and donated by the membership. Opinions expressed in this publication are those of the individual author and do not necessarily represent, nor reflect, the opinions of MILATARI nor those of any other commercial or non-commercial organizations. Any article appearing in this newsletter may be reproduced, providing credit is given to the author and to MILATARI.

Your contribution of articles are always welcome. You may submit your article on ATARI compatible cassette, diskette, on typewritten form, or you can arrange with the editor to download your file via a modem at either 300 or 1200 BAUD. When submitting your article on cassette or diskette, please do not include any format control codes imbedded within the text. Deadline for articles is the last day of each month for inclusion on the next issue.

Write MILATARI NEWSLETTER, P.O. Box 1191, Waukesha, WI 53187-1191 for more information.

MEMBERSHIP INFORMATION:

Membership is open to individuals and families who are interested in using and programming ATARI computers. The membership includes a subscription to this newsletter and access to the clubs cassette, diskette and publication libraries.

There are 3 classes of memberships available. Associate, Individual and Family. Associate members can attend all club functions and may withdrawal materials from the club libraries. In addition to attending club functions and checking out materials from the libraries, Individual and Family members are entitled to vote in club elections and to hold elected position in the organization. The annual membership fees are $10.00 for associate, $15.00 for individual, and $20.00 for the family membership. Members are expect to abide by the by-laws of the club. You may receive a copy of the by-laws by contacting the club secretary.

For more information on how to join MILATARI, please contact the membership committee.

MEETING INFORMATION:

MILATARI meetings are held once monthly. The meetings are currently being held at the Armbruster School, 7000 Greenway, Greenfield. (Off 68th Street, behind Southridge Shopping Center.) The date of the meeting is the

MILATARI Officers:

President	Gary Nolan	353-9716
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Newsletter Editor	David Frazer	542-7242
Bulletin Board SYSOP	Pete Kurth	355-6031(BBS)

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TECHNICAL SUPPORT GROUP:

The following members have indicated a willingness to assist MILATARI members with programming and other related technical problems. Please be polite and do not call these members during meal periods or at very early or very late hours.

William Lawrence	Programming	1-968-3082
Don Wilcox	Programming	228-1650
Erik Hansen	Prog/Tech	252-3146
Gary Nolan	Prog/Tech	353-9716
Steve Booth	Programming	367-8739
Nick Liberski	Prog/Tech	782-5594
David Frazer	Prog/Tech	542-7242

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MILATARI BULLETIN BOARD:

The Milwaukee Area ATARI Users Group maintains a 24 hour bulletin board service. This board is designed for the use of our members and other ATARI users around the country. The BBS allows for upload and downloading programs and files, a public message board and club news. The board operates at 300 BAUD. The phone number is

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